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TELEGRAPH SWITCHING

SIGNALLING OVER RADIO AND MULTIPLEXED CHANNELS

REQUIREMENTS FOR TELEX AND GENTEX OPERATION TO BE MET BY CODE - AND SPEED - DEPENDENT TDM SYSTEMS CONFORMING TO RECOMMENDATION R.101

ITU-T Recommendation U.25

(Extract from the *Blue Book*)

NOTES

1   ITU-T Recommendation U.25 was published in Fascicle VII.2 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation U.25

REQUIREMENTS FOR TELEX AND GENTEX OPERATION
TO BE MET BY CODE- AND SPEED-DEPENDENT TDM SYSTEMS
CONFORMING TO RECOMMENDATION R.101

(Geneva, 1980)

The CCITT,

considering

(a) that it may be desirable to use code- and speed-dependent TDM systems described in Recommendation R.101 in the teleprinter switching networks;

(b) that it is essential to transmit the full range of telex signals for types A, B, C and D signalling;

unanimously declares

that the following requirements for telex and gentex operation should be met by code- and speed dependent time division multiplex systems conforming to Recommendation R.101.

1 Transmission of type A (control) signals shall be accomplished within the tolerances specified in Table 1/U.25.

2 Transmission of type B (control) signals shall be accomplished within the tolerances specified in Table 2/U.25.

3 Transmission of type C signals shall be accomplished in accordance with Table 3/U.25.

4 Transmission of type D signals shall be accomplished in accordance with Recommendation U.12.

5 Each of the following modes of bothway telex signalling shall be capable of being accomplished on a single circuit:

a) type A in one direction and type B keyboard in the other;

h) type A in one direction and type B dial in the other;

c) type B keyboard in one direction and type B dial in the other;

d) type A in both directions;

c) type B dial in both directions;

f) type B keyboard in both directions;

g) type C to Table 1/U.11;

h) type C to Table 2/U.11;

i) type C to Table 3/U.11.

6 A single terminal shall be capable of handling any of the signalling combinations shown in § 5 above and at least five of them simultaneously.

7 The nominal pulse duration (other than dial pulses) shown in Tables l/U.25, 2/U.25 and 3/U.25 for *Signal transmitted to telex* have a ± 3 ms tolerance except where otherwise indicated.

TABLE 1/U.25

Type A signalling

Signalling condition	Signal received from telex (Recommendation U.1)	Signal on aggregate path (Note 1)	Signal transmitted to telex
Free line	Continuous A polarity on both signalling paths	Continuous A polarity	Continuous A polarity
Call	Inversion to Z polarity on forward signalling path	Inversion to Z polarity	Inversion to Z polarity (within 50 ms of inversion in column 2) (Note 2)
Call-confirmation	Inversion to Z polarity on backward signalling path	As for call	As for call
Proceed to select	Teleprinter signals (semi-automatic) or an interval of polarity for not less than 100 ms folowed by 40 ± 8 ms of A polarity on the backward path	Teleprinter signals (semi-automatic) or no less than 5 bits of Z polarity followed by 2 bits of A polarity	Teleprinter signals (semi-automatic) or Z polarity for no less than 97 ms followed by 40 ms of A polarity
Selection	Teleprinter signals on forward path	Teleprinter signals	Teleprinter signals
Call-connect	Teleprinter signals or 150 ms ($\pm$ 11 ms) pulse of A polarity followed by a minimum of 2 s of Z polarity on the back-ward path	Teleprinter signals or 7 or 8 bits of A polarity fol-lowed by a minimum of 102 bits of Z polarity	Teleprinter signals or 140 or 157 ms pulse of A polarity followed by a minimum 1.997 s of Z polarity
Service signals	Teleprinter signals on backward path followed by a clearing signal	Teleprinter signals followed by continuous A polarity	Teleprinter signals followed by con-tinuous A polarity
Clear	Inversion to A polarity on either signalling path	Inversion to A path	Inversion to A polarity
Clear-confirmation	Inversion to A polarity in opposite direction to clear after a delay of 350-1500 ms following receipt of the clear signal	As for clear	As for clear
Automatic retest	Z polarity for 2 s $\pm$ 10% followed by A polarity lasting at least 58 s $\pm$ 10% repeated	91-112 bits of Z polarity followed by at lest 2665 bits of A polarity	1.782-2.194 s of Z polarity followed by at least 52.188 s of A polarity

For notes, see Table 3/U.25.

TABLE 2/U.25

Type B signalling

Signalling condition	Signal received from telex	Signal on aggregate path (Note 1)	Signal transmitted to telex
Free line	As for type A	As for type A	As for type A
Call	As for type A	As for type A	As for type A
Call confirmation	17-35 ms pulse of Z polarity on the backward path returned within 150 ms of receipt of the call signal	1-2 bits of Z polarity	20-40 ms pulse of Z polarity
Proceed-to-select	As for call-confirmation. the interval of A polarity separating the pulses will be 100 ms minimum	Interval of not less than 5 bits of A polarity followed by 1-2 bits of Z polarity	As for call-confirmation. The interval between the pulses to be nominally 100 ms minimum
Selection signals	Teleprinter signals or dial pulses having the following limits: Speed = 9-11 pps, Z: A ratio = 1 : 1.2 to 1 : 1.9 (Recommendation U.2)	Teleprinter signals or dial pulses, where each A polarity is transmitted as 2-4 bits and each Z polarity as at least 1 bit, the mean speed of pulsing being the same as the input	Teleprinter signals or dial pulses in accordance with Recommendation U.2
Call connected	Continuous Z polarity on the backward path (2 s minimum, possibly followed by teleprinter signals)	Continuous Z polarity (102 bits of Z polarity minimum, possibly followed by teleprinter ignals)	Continuous Z polarity (1.997 s minimum, possibly followed by teleprinter signals)
Service signal (busy impulse)	165-260 ms of Z polarity on the backward path followed by A polarity for 1500 ms (± 30%) continuously repeated (the A polarity period may be preceded by teleprinter signals, in which case the tolerance of the A polarity is reduced to ± 20%)	8-14 bits of Z polarity followed by 53-100 bits of A polarity continuously repeated or 8-14 bits of Z polarity followed by teleprinter signals followed by 61-92 bits of A polarity continuously repeated	156-275 ms of Z polarity followed by A polarity of minimum duration 1037 ms (the A polarity period may be preceded by teleprinter signals)
Clear and clear-confirmation	As for type A	As for type A	As for type A
Automatic retest	As for type A	As for type A	As for type A

For notes, see Table 3/U.25.

TABLE 3/U.25

Type C signalling

Signalling condition	Signal received from telex (Recommendation U.11)	Signal on aggregate path (Note 1)	Signal transmitted to telex
Free line	Continuous A polarity on both signalling paths	Continuous A polarity	Continuous A polarity
Call or automatic retest	Inversion to Z polarity on forward path for 150-300 ms followed by teleprinter signals	Inversion to Z plarity for 7-16 bits followed by teleprinter signals	Inversion to Z polarity (within 50 ms of inversion in column 2) for 140-314 ms followed by teleprinter signals (Note 2)
Transit proceed to select	Z polarity for not less than 450 ms folllowed by code combination No. 22 (nominally 40 ms pulse of A polarity)	Not less than 22 bits of Z polarity followed by 2 bits of A polarity	Not less than 430 ms of Z polarity followed by 40 ms of a polarity
Reception confirmation or equipment congestion	Inversion to Z polarity on backward path for 450 ms (± 10%) followed by teleprinter signals or clearing signal	Inversion to Z polarity for 20-26 bits followed by teleprinter signals or continuous A polarity	Inversion to Z polarity for 391-510 ms followed by teleprinter signals or continuous A polarity
Clear and clear-confirmation	As for type A	As for type A	As for type A

Notes concerning Tables 1/U.25 to 3/U.25

1. Actual polarity of each channel on the aggregate path will conform to § 5.5.1.1 (alternative A) or § 5.6.3 (alternative B) of Recommendation R.101.

2. The time delay of signals through the multiplex equipment shall not exceed 50 ms.

3. Pulses of Z or A polarity less than 10 ms shall be rejected by the multiplex equipment.

4. The tolerances shown for the *Signal transmitted to telex* shall not be exceeded when more than one pair of terminals are connected in tandem.

5. It is accepted that the *Signal transmitted to telex* may deviate from the tolerances given in the tables when the *Signal received from telex* conforms to Recommendation U.24 but not to Recommendation U.1 or U.11. In this event the *Signal transmitted to telex* shall not exceed the tolerances given in Recommendation U.24.